Nischay Joshi

Vancouver, BC | 2368639896 | nischayjoshi2312@gmail.com | linkedin/in/nishjoe | nischay2312.github.io/

TECHNICAL SKILLS

Hardware: Microcontrollers, Oscilloscope, Signal Generator, Soldering (THT/SMT), Power Supplies, Schematic Capture, PCB Design, Digital Logic Design, VLSI Design/Analysis, Robotics
Programing Languages: C++, C, Python, Assembly, System Verilog
Technologies: Git, SVN, MATLAB, Altium Designer, Xilinx Vivado, Vitis, Petalinux

EDUCATION

UNIVERSITY OF BRITISH COLUMBIA   **Vancouver, BC**
Bachelor of Applied Science – Electrical Engineering   *Expected May 2025*
Relevant Coursework:
Data Structures and Algorithm, Digital Systems Design, Embedded C/C++ Projects, Robotics

WORK EXPERIENCE

TRIUMF   **Vancouver, BC**
Firmware Development Co-op   *May 2023 – Present*
- Developed and implemented a testing procedure for external cards controlling DACs, comparators, and high-speed LEDs. Reduced the testing and verification time by 65%
- Wrote firmware for a Xilinx Mercury X1 board with Zynq Ultra scale FPGA and assisted in the deployment of Petalinux as the operating system on the main Xilinx board
- Enhanced a custom UART IP module in Vivado to increase its FIFO size from 16 to 1024 characters and developed user space C++ drivers for it to operate on Petalinux. This work, aimed at improving data handling and transmission speed, will be used in significant international physics experiments at CERN (HyperK and NuPRISM)

UBC ECE (Molecular Mechatronics Lab)   **Vancouver, BC**
Undergraduate Research Intern   *September 2022 – April 2023*
- Assisted in testing and characterizing over 20 soft and flexible touch sensors spanning over 5 different topologies, improved the sensor's performance by 20% after analysing the data
- Designed an external hardware debugging system for the main computing unit using Altium Designer
- Developed and maintained firmware for different sensor configuration which integrated functionalities such as OTA, BLE, UART and SPI

TECHNICAL PROJECTS

6 DOF Robot Arm Controller | *Robotics, C++, Python, MATLAB Simulation*   **April 2023 – Present**
- Developed a controller for a 6 Degree of Freedom robot arm kit using servo motors to control the joint angles
- Utilized Python to enable manual control of the robot using a USB Gamepad and transmitted the joint angles to the robot via serial communication
- Implemented custom inverse kinematics solvers based on Gradient Descent and Pseudo Inverse Jacobian approaches and compared their performance in MATLAB, simulating the robot using the Robotics System toolbox
- Integrated visual feedback for the robot using an ESP-Cam, providing information about the robot's environment
- Created a custom animation engine in C++ to animate eyes for the robot to enhance its personality. Deployed the system on an ESP32 with a 128x160px ST7735 LCD display. Added numerous animation effects such as wake up, sleep, looking around and moods such as happy, sad, scared, and angry

ESP32 Spectrum Analyser | *C++, Amplifier Design, Signal Processing*   **August 2022 – September 2022**
- Designed a Signal Spectrum analyser running on ESP 32. The device displays real-time spectral content of the signal with a refresh rate of 30 Hz
- Optimized the firmware to utilize the hardware capabilities of the ESP32 such as DMA, I2S, Dual Cores
- Designed a custom PCB for the device using Altium Designer including a microphone Class A amplifier to add the functionality to view the waveform and spectrum of human voice

Windows Streamer | *ESP32,* C++, *WebSockets, Python*   **August 2022 – August 2023**
- Developed a screen mirroring embedded system running on an ESP32 and combined with a 168x120 LCD color display. The system mirrors your computer screen in real-time by transmitting visual data from the host to the client via Websockets
- Improved the video frame rate from by 300% by adding JPEG compression and multi-threaded transmission approach. Minimized latency by switching to C++ libraries in python for faster processing speeds

ENGINEERING STUDENT TEAMS

UBC UNCREWED AIRCRAFTS SYSTEMS   **Vancouver, BC**
Payload Team Co-Lead   *January 2022 - Present*
- Assisted in developing the cabin interior of an air taxi designed to transport Barbie dolls, configuring and installing an electrical system to control the cabin door, seat belts, door lock, exterior lights, in-house music player, and interior lighting system
- Worked on the self-driving rover payload and implemented various sub-functions. These included landing detection, steering interface, altitude detection, a PID controller for the robot to follow GPS coordinates, and the calculation of the rover's orientation in 3D space
- Developed firmware for a Teensy 4.0 microcontroller, utilizing hardware and software interrupts to run multiple tasks concurrently

UBC ROCKET   **Vancouver, BC**
Avionics Team Member   *September 2019 – February 2020*
- Assisted in selection of barometric sensors, inertial measurement units and temperature sensors for rocket's main electronic board. The selection was based on a variety of criteria such as bit-resolution, cost, communication protocol support, range, and size
- Designed a circuit to detect current battery level

AWARDS/ACADEMIC ACHIEVEMENTS
- Faculty of Applied Science International Student Scholarship   2022
- Trek Scholarship (International)   2022, 2021
- Dean's Honor List   2022, 2021

INTERESTS AND ACTIVITIES
- Lawn Tennis
- Classical Piano
- Photoshop and Digital Art
- YouTube channel for showcasing electronic projects (https://bit.ly/3y1fLe3)